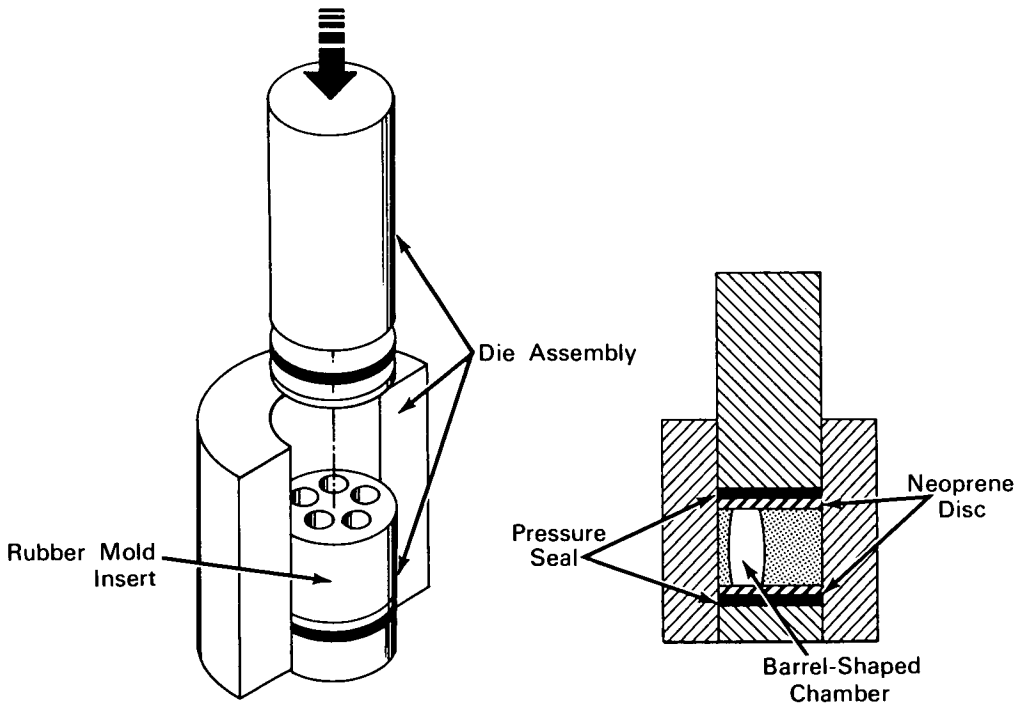
NASA TECH BRIEF

This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

Pressure Molding of Powdered Materials Improved by Rubber Mold Insert



The problem: The pressure molding of tungsten microspheres in a conventional cylindrical steel die has produced castings containing shear fractures. Approximately 25% of die ram loading is transmitted to the die cavity walls, deflecting them a small but significant amount. Upon decrease of die ram pressure after pressure molding is complete, the die cavity walls recover elastically and exert radial inward stresses which produce shear components that fracture the casting.

The solution: Pressure molding tungsten microspheres by applying hydraulic pressure to a silicone rubber mold insert, formed with several barrel-shaped chambers, placed in the steel die cavity.

How it's done: A silicone rubber mold is placed in the steel die cavity above a leaded bronze pressure seal and neoprene disc. The tungsten microspheres are poured into the barrel-shaped chambers of the mold and a neoprene disc plus leaded bronze pressure seal placed above the mold. The die ram engages the seal and hydrostatic or hydraulic pressure (up to 56,600 psi) is applied. Decrease in ram pressure is accompanied by mold rubber deflection away from, rather

(continued overleaf)

than toward, the castings and the shrinkage plus rim-tension occurring with steel molds is eliminated.

Notes:

1. This method makes variations in casting size and shape relatively inexpensive considering the cost of machining conventional steel dies.
2. Using this method, conventional hydraulic press and die equipment may be substituted for bulky and expensive hydrostatic equipment.
3. The rubber mold insert permits castings of weakly bonding particles that cannot be pressed integrally in a conventional steel die.
4. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Western Operations Office
   150 Pico Boulevard
   Santa Monica, California, 90406
   Reference: B64-10270

Patent status: NASA encouranges commercial use of this innovation. No patent action is contemplated.

Source: Electro-Optical Systems Corp.
under contract to Western Operations Office
(WOO-100)